Towards best practices for authorship and research evaluation

Effects of performance metrics & the Leiden Manifesto

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Research

Research at CWTS is organized into three research groups, three chairs (partly integrated in the research groups), and a working group. In addition, CWTS pays special attention to three research themes that are of major importance for research management and research policy.

Research groups

- Quantitative Science Studies
- Science and Evaluation Studies
- Science, Technology, and Innov...
CONSTITUTIVE EFFECTS OF EVALUATION

Evaluation and metrics influence quite routine activities at various stages of the research process. This research line charts these
Some initial observations

• Research has become a strategic enterprise in which permanent communication is crucial

• The relative professional autonomy of science and scholarship has weakened considerably

• Both “quality/excellence” and “impact” have become crucial for success at all levels of the scientific system

• Quality and impact are mutually dependent in complex ways

• Peer & expert review and indicator based assessment have become intimately intertwined and mutually shape each other
Four main problems

1. The funding system
2. The career structure
3. The publication system
4. The evaluation system
The Evaluation Gap

- discrepancy between evaluation criteria and the social and economic functions of science

- lack of recognition for new types of work that researchers perform
A manifesto for reproducible science

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Improving the reliability and efficiency of scientific research will enable us to accelerate discovery. Here we argue for the adoption of open methods, reporting and dissemination practices for empirical studies.

A hallmark of scientific creativity is the ability to see novel and unexpected patterns in data. John Snow’s identification of links between}

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[Note: The text continues, but it is not fully visible in the image provided. The text highlights the importance of reproducible science and calls for open methods, reporting, and dissemination practices for empirical studies.]
‘Old-world’ metrics sustain perverse publishing incentives
Two widely (mis)used bibliometric indicators: Journal Impact Factor and Hirsch Index

• Definition of JIF:
  – The mean citation score of a journal, determined by dividing all citations in year $T$ by all citable documents in years $T-1$ and $T-2$

• Definition of h-index:
  – The ‘impact’ of a researcher, determined by the number of received citations of an oeuvre, sorted by descending order, where the number of received citations equals the rank position
Some conceptual problems with JIF

- Inflates impact of all researchers publishing in same journal
- Promotes journal publishing
- Stimulates one-indicator thinking
- Ignores other scholarly virtues
Some conceptual problems with H-index

- Biased against young researchers
- Biased against selective researchers
- Invites strategic behavior
- Ignores other elements of scholarly activity
- Promotes one-indicator thinking
• Appropriation and expropriation

• Peer & expert review and indicator based assessment have become intimately intertwined and mutually shape each other

• Research assessment is not a measurement problem, because assessments are performative →

  Indicators acquire (additional) meaning through contexts of use (Dahler-Larsen 2013)
Messed-up practices
Thinking with Indicators in life sciences


The Journal Impact Factor

“Nobody’s going to give you a grant if you have four papers in an impact factor 1 journal, but you may get a grant based on a paper that you published in an impact factor 12 journal or higher, right?

And so at that time, we said, “We have to change the requirement for getting the PhD,” and now, we set that bar at 15 impact points. So if you get a paper in an impact factor 15 journal, basically, you’re done. And we’ve really noticed a change in that stimulating people for quality, and go for that one nice paper.”

Rushforth and De Rijcke, Minerva, 2015
Assessing work-in-progress manuscripts
Grading for novelty and quality

PI goes to computer. “Any alternatives? Any journals?”

PhD: Hmm maybe [Journal C]. They are similar in impact right?

Post-doc: Yeah seven-ish. It’s difficult because some papers are descriptive and some have mechanism. So for this paper it could actually go one step higher than Journal C because you’re going a bit beyond description. They also have priority reports in [Journal B].

PI: [Journal D] also has very fast publishing periods from date of submission- if they like it of course.

(Fieldnote 22 July 2014)
Problems, research and indicators

Space of problems
Problems, research and indicators

Space of problems

Space of research
Problems, research and indicators

- Space of problems
- Space of research
- Space of STI indicators
Streetlight effect indicators

Space of problems

Space of research

Research well-illuminated by indicators
Streetlight effect in indicators: mistaking light with “problems”
Questions dealt by research under streetlight will be better rewarded.

Reduced diversity of research efforts...

...reduced coverage of societal needs
Space of problems

Space of research

Space of STI indicators
This is the move we should facilitate:
Responsible Metrics
The Leiden Manifesto for research metrics

A collaboration between Diana Hicks (Georgia Tech), Paul Wouters (CWTS), Ismael Rafols (SPRU/Ingenio), Sarah de Rijcke and Ludo Waltman (CWTS)
The Leiden Manifesto

• Quantitative evaluation should support expert assessment.
• Measure performance in accordance with the research mission.
• Protect excellence in locally relevant research
• Keep data collection and analytical processes open, transparent and simple.
• Allow for data verification
• Account for variation by field in publication and citation practices
• Data should be interpreted taking into account the difficulty of credit assignment in the case of multi-authored publications.
• Base assessment of individual researchers on *qualitative* judgment.
• False precision should be avoided (eg. the JIF).
• Systemic effects of the assessment and the indicators should be taken into account and indicators should be updated regularly

Experiments with evidence in context
Solutions?

Fewer numbers, better science

Scientific quality is hard to define, and numbers are easy to look at. But bibliometrics are warping science — encouraging quantity over quality. Leaders at two research institutions describe how they do things differently.

REDEFINE EXCELLENCE
Fix incentives to fix science

Rinze Benedictus and Frank Miedema

An obsession with metrics pervades science. Our institution, the University Medical Center Utrecht in the Netherlands, is not exempt. On our website, we proudly declare that we publish about 2,600 peer-reviewed scientific publications per year, with higher than average citation rates.

A few years ago, an evaluation committee spent hours discussing which of several faculty members to promote, only to settle on the two who had already been awarded particularly prestigious grants. Meanwhile, faculty members who spent time crafting policy advice had a hard time explaining how this added to their scientific output, even when it affected clinical decisions across the country.

Publications that directly influenced patient care were weighted no higher in evaluations than any other paper, and
aim is to give researchers a voice in evaluation

- evidence based arguments
- shift to dialog orientation
- selection of indicators
- narrative component
- Good Evaluation Practices
- envisioned as web service
ACUMEN Portfolio

Career Narrative
Links expertise, output, and influence together in an evidence-based argument; included content is negotiated with evaluator and tailored to the particular evaluation.

Expertise
- scientific/scholarly
- technological
- communication
- organizational
- knowledge transfer
- educational

Output
- publications
- public media
- teaching
- web/social media
- data sets
- software/tools
- infrastructure
- grant proposals

Influence
- on science
- on society
- on economy
- on teaching

Evaluation Guidelines
- aimed at both researchers and evaluators
- development of evidence based arguments (what counts as evidence?)
- expanded list of research output
- establishing provenance
- taxonomy of indicators: bibliometric, webometric, altmetric
- guidance on use of indicators
- contextual considerations, such as: stage of career, discipline, and country of residence
Examples next generation metrics

• PCRST indices (Ioannidis 2014)
• Productivity index:
  • preprints as evidence of productivity in grant applications
• “S-index” (Olfson 2017) – proportion of papers accompanied by shareable material, data, protocols
• Did applicant’s previous studies follow quality standards (fi for reporting; EQUATOR)?
• ‘Open data index’
Context counts

Responsible metrics are not supposed to be a universal standard

Responsible metrics should be responsive and inclusive metrics

The context shapes what responsible metrics means
Thank you for your attention